Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Pediatric heart surgery: volume.

Source(s)

AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 4.2]. PDI #7 pediatric heart surgery volume. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 4 p.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Measure Domain

Primary Measure Domain

Structure

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the Measure Validity page.

Secondary Measure Domain

Outcome

Brief Abstract

Description

This measure is used to assess the number of patients undergoing surgery for congenital heart disease.

Rationale

This indicator was developed as part of the Agency for Healthcare Research and Quality's (AHRQ's) Inpatient Quality Indicator measure set and is based on an indicator developed by Kathy Jenkins and

colleagues. Dr. Jenkins developed this indicator based on physician input and empirical analyses and further studies have studied the relationship of volume to morbidity and mortality. (Jenkins et al., Pediatrics 1995; Hannan et al., Pediatrics 1998; Sollano et al., J Thorac Cardiovasc Surg 1999)

Procedure volume is a surrogate measure of quality; its face validity depends on whether a strong association with outcomes of care is both plausible and widely accepted in the professional community.

Pediatric cardiac surgery requires technical proficiency with the use of complex equipment. Technical errors may lead to clinically significant complications, such as arrhythmias, congestive heart failure, and death. However, the measure developers are not aware of any consensus guidelines or recommendations regarding minimum procedure volume.

Refer to the original measure documentation for additional literature based evidence about this measure organized by the following topics: "Precision," "Minimum bias," "Construct validity," "Fosters true quality improvement," and "Prior use."

Primary Clinical Component

Pediatric heart surgery; congenital heart disease; volume

Denominator Description

This measure applies to providers of pediatric heart surgery (one provider at a time).

Numerator Description

Discharges under age 18 with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) procedure codes for either congenital heart disease in any field *or* non-specific heart surgery with ICD-9-CM diagnosis of congenital heart disease in any field

Exclude cases:

- Major Diagnostic Category (MDC) 14 (pregnancy, childbirth and puerperium)
- With transcatheter interventions as single cardiac procedures, performed without bypass but with catheterization
- With septal defects as single cardiac procedures without bypass

Note: Refer to the original measure documentation for specific ICD-9-CM codes.

Evidence Supporting the Measure

Evidence Supporting the Criterion of Quality

A formal consensus procedure involving experts in relevant clinical, methodological, and organizational sciences

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Evidence Supporting Need for the Measure

Need for the Measure

Variation in quality for the performance measured

Evidence Supporting Need for the Measure

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

State of Use of the Measure

State of Use

Current routine use

Current Use

Internal quality improvement

Quality of care research

Application of Measure in its Current Use

Care Setting

Hospitals

Professionals Responsible for Health Care

Physicians

Lowest Level of Health Care Delivery Addressed

Single Health Care Delivery Organizations

Target Population Age

Does not apply to this measure

Target Population Gender

Does not apply to this measure

Stratification by Vulnerable Populations

Does not apply to this measure

Characteristics of the Primary Clinical Component

Incidence/Prevalence

Unspecified

Association with Vulnerable Populations

Unspecified

Burden of Illness

See the "Rationale" field.

Utilization

Unspecified

Costs

Unspecified

Institute of Medicine (IOM) Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Data Collection for the Measure

Case Finding

Does not apply to this measure

Denominator Sampling Frame

Does not apply to this measure

Denominator Inclusions/Exclusions

Inclusions
This measure applies to providers of pediatric heart surgery (one provider at a time).

Exclusions
Unspecified

Relationship of Denominator to Numerator

Does not apply to this measure

Denominator (Index) Event

Does not apply to this measure

Denominator Time Window

Does not apply to this measure

Numerator Inclusions/Exclusions

Inclusions
Discharges under age 18 with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) procedure codes for either congenital heart disease in any field *or* non-specific heart surgery with ICD-9-CM diagnosis of congenital heart disease in any field

Exclusions
Exclude cases:

- Major Diagnostic Category (MDC) 14 (pregnancy, childbirth and puerperium)
- With transcatheter interventions as single cardiac procedures, performed without bypass but with catheterization
- With septal defects as single cardiac procedures without bypass

Note: Refer to the original measure documentation for specific ICD-9-CM codes.

Measure Results Under Control of Health Care Professionals, Organizations and/or Policymakers

The measure results are somewhat or substantially under the control of the health care professionals, organizations and/or policymakers to whom the measure applies.

Numerator Time Window

Fixed time period

Data Source

Administrative data

Level of Determination of Quality

Does not apply to this measure

Outcome Type

Proxy for Outcome

Pre-existing Instrument Used

Unspecified

Computation of the Measure

Scoring

Count

Interpretation of Score

Better quality is associated with a higher score

Allowance for Patient Factors

Does not apply to this measure

Standard of Comparison

Internal time comparison

Evaluation of Measure Properties

Extent of Measure Testing

The development of the Agency for Healthcare Research and Quality (AHRQ) Pediatric Quality Indicators utilizes a four pronged approach: identification of candidate indicators, literature review, empirical analyses, and panel review. Candidate indicators were identified through both published literature and a brief survey of national organizations. Literature review provided descriptions and evaluations of some candidate indicators and the underlying relationship to quality of care. Empirical analyses were conducted to explore alternative definitions; to assess nationwide rates and hospital variation; and to develop appropriate methods to account for variation in risk. Clinical panel review helped to refine indicator definitions and risk groupings, and to establish face validity in light of the limited evidence from the literature for most pediatric indicators. Information from these sources was used to specify indicator definitions and make recommendations to AHRQ regarding the best indicators for inclusion in the pediatric indicator set.

A structured review of each indicator was undertaken to evaluate face validity (from a clinical perspective). This process mirrored that undertaken during the initial development of the Patient Safety Indicators. Specifically, the panel approach established *consensual validity*, which "extends face validity from one expert to a panel of experts who examine and rate the appropriateness of each item..." The

methodology for the structured review was adapted from the RAND/UCLA Appropriateness Method and consisted of an initial independent assessment of each indicator by clinician panelists using an initial questionnaire, a conference call among all panelists, followed by a final independent assessment by clinician panelists using the same questionnaire. The panel process served to refine definitions of some indicators, add new measures, and dismiss indicators with major concerns from further consideration.

Empirical analyses were conducted to provide the clinical panels and peer review participants with additional information about the indicators. These analyses were also used by the development team to test the alternative specifications and the relative contribution of indicator components in the numerator and denominator. These analyses were not intended to inform issues of precision, bias and construct validity, which will be addressed separately. The data source used in the empirical analyses was the 2003 Kids' Inpatient Sample (KID).

Refer to the original measure documentation for additional details.

Evidence for Reliability/Validity Testing

Fitch K, Bernstein SJ, Aguilar MS, Burnand B, LaCelle JR, Lazaro P, van het Loo M, McDonnell J, Vader J, Kahan JP. The RAND/UCLA appropriateness method user's manual. Santa Monica (CA): RAND; 2001. 109 p.

Green L, Lewis F. Measurement and evaluation in health education and health promotion. Mountain View (CA): Mayfield Publishing Company; 1998.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Identifying Information

Original Title

PDI #7 pediatric heart surgery volume.

Measure Collection Name

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

Measure Set Name

Pediatric Quality Indicators

Submitter

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Developer

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Funding Source(s)

Agency for Healthcare Research and Quality (AHRQ)

Composition of the Group that Developed the Measure

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators are in the public domain and the specifications come from multiple sources, including the published and unpublished literature, users, researchers, and other organizations. AHRQ as an agency is responsible for the content of the indicators.

Financial Disclosures/Other Potential Conflicts of Interest

None

Endorser

National Quality Forum - None

Adaptation

This measure was adapted from the Agency for Healthcare Research and Quality (AHRQ) Inpatient Quality Indicators.

Parent Measure

Pediatric heart surgery volume (IQI 3) (Agency for Healthcare Research and Quality [AHRQ])

Release Date

2006 Feb

Revision Date

2010 Sep

Measure Status

This is the current release of the measure.

This measure updates a previous version: AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 4.1]. PDI #7 pediatric heart surgery volume. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2009 Dec. 4 p.

Source(s)

AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 4.2]. PDI #7 pediatric heart surgery volume. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 4 p.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Measure Availability

The individual measure, "PDI #7 Pediatric Heart Surgery Volume," is published in "Measures of Pediatric Health Care Quality Based on Hospital Administrative Data: The Pediatric Quality Indicators" and "AHRQ Quality Indicators. Pediatric Quality Indicators: Technical Specifications." These documents are available in Portable Document Format (PDF) from the Pediatric Quality Indicators Resources page at the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators Web site.

For more information, please contact the QI Support Team at support@qualityindicators.ahrq.gov.

Companion Documents

The following are available:

AHRQ quality indicators. Pediatric quality indicators: software documentation, SAS [version 4.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 45 p. This document is available in Portable Document Format (PDF) from the AHRQ Quality Indicators Web site.

AHRQ quality indicators. Software documentation: Windows [version 4.1a]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Jul 2. 97 p. This document is available in PDF from the AHRQ Quality Indicators Web site.

AHRQ quality indicators. Pediatric quality indicators composite measure workgroup. Final report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Mar. Various p. This document is available in PDF from the AHRQ Quality Indicators Web site.

AHRQ quality indicator. Comparative data for the PDI based on the 2008 Nationwide Inpatient Sample (NIS) [version 4.1b]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 20 p. This document is available in PDF from the AHRQ Quality Indicators Web site.

AHRQ quality indicators: composite measures user guide for the pediatric quality indicators (PDI) [version 4.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Sep. 6 p. This document is available in PDF from the AHRQ Quality Indicators Web site.

HCUPnet: a tool for identifying, tracking, and analyzing national hospital statistics. [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); [accessed 2010 Jan 4]. HCUPnet is available from the AHRQ Web site. See the related QualityTools summary.

NQMC Status

This NQMC summary was completed by ECRI Institute on December 28, 2007. The information was verified by the measure developer on March 31, 2008. This NQMC summary was updated by ECRI Institute on June 25, 2010. This NQMC summary was reviewed and edited by ECRI on July 15, 2011.

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